

Lighting System Upgrades and Maintenance

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13W Twin-tube Compact Fluorescent



13W Twin-tube Compact Fluorescent

- Problems
 - 1. EOL (end of life failure)
 - 2. Delay when starting

- Solutions
 - Retrofit fixture to 4-Pin lamp and ballast
 - 2. Use 2-Pin E-start lamp

26W Double Twin Tube



26W Double Twin Tube

- Problems
 - 1. EOL (end of life failure)
 - 2. Delay when starting

- Solutions
 - Retrofit fixture to 4-Pin lamp and ballast
 - 2. Use 2-Pin E-start lamp

1000W Metal Halide



1000W Metal Halide

- Problems
 - Lumen maintenance
 - 2. Non passive failure
 - 3. Color shift over life

- Solutions
 - Pulse start retrofit
 - 2. Protected lamp
 - 3. Group re-lamping

Metal Halide Fresnel downlight



Metal Halide Fresnel downlight

- Problems
 - 1. Color shift lamp to lamp
 - Poor CRI

- Solutions
 - 1. Group re-lamping
 - Ceramic metal halide (CRI)

Metal Halide Downlight, open rated

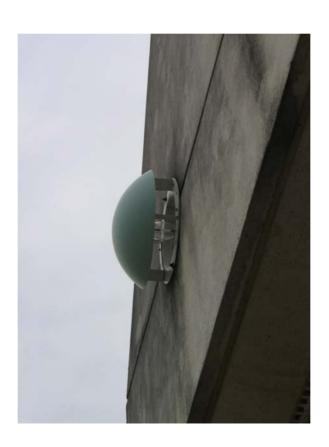


Metal Halide Downlight, open rated

- Problems
 - 1. Color shift with old lamps
 - 2. Requires expensive open rated lamp
 - 3. Poor color renderings
 - 4. Creates striations on the floor of wall

- Solutions
 - 1. Group re-lamp
 - 2. Open rated lamps are only solution here
 - 3. Ceramic Metal Halide
 - 4. Use a coated lamp, this softens this effect

High Pressure Sodium (HPS)



HPS Wallpack



High Pressure Sodium (HPS)

- Problems
 - Life greater than 24,000 hours
 - 2. Yellow light with poor CRI
 - 3. Cycling at end of life

- Solutions
 - 1. Use long life version that gives 40,000 hours
 - HPS retro-fit lamp to Metal Halide white light
 - Non-cycle lamp technology

Exit sign



Exit Sign

- Problems
 - Short lamp life
 - Bulky battery pack for incandescent / fluorescent operation
 - 3. High energy consumption

- Solutions
 - 1. LED Exit Sign
 - 2. LED Exit Sign
 - 3. LED Exit Sign

400W Metal Halide Highbay



400W Metal Halide Highbay

- Problems
 - Color shift
 - 2. Color Rendering
 - 3. Lumen Maintenance
 - 4. Hot Restrike
 - 5. Energy Consumption

- Solutions
 - 1. Group re-lamping
 - 2. Ceramic Metal Halide
 - 3. Pulse start technology
 - 4. Pulse start technology
 - 5. Pulse start / WM lamps

* High output Linear Fluorescent Systems are another solution but require a complete lighting system retro-fit

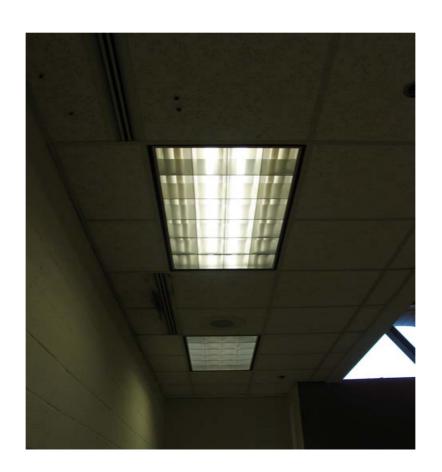
F34 or F40/WM T12 Toffer



F34 or F40/WM T12 Strip



F34 or F40/WM T12 Troffer



F34 or F40/WM T12 Troffers - Strips

- Problems
 - 1. Energy consumption
 - 2. Poor lumen maintenance
 - 3. Poor color
 - 4. Can't be dimmed
 - 5. Life needs to be longer than 20,000 hours
 - 6. Disposal

- Solutions
 - T8 retrofit with electronic ballast
 - 2. T8 systems have 95% LM
 - 3. T8 CRI up to 86
 - 4. Dimming ballasts available
 - 5. XL versions of T8 lamp available, 36,000 hour life (at 12 hours per start)
 - Recycle or TCLP Compliant

Summary

- Look for T12 retrofit opportunities
- Use LED Exit Sign
- Planned Replacement
 - Fluorescent Systems
 - HID Systems



Questions?